JACOBS

Date: 4/12/2007

To: Paul L'Heureux, Gary Morin, Maurice Beaudoin, Mark Anderson

Cc: W. Pencola, A. Rigassio-Smith, M. Gouveia, Project File

From: Michael Anderson

RE: DRAFT Conceptual Estimate – Alternative #2 – CAD Cell Approach

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Attached please find the subject draft conceptual estimate. The estimate was prepared utilizing the $15 Million/year funding scenario with a 3.5% cost index. A period of ten years was assumed for estimating purposes for Operation and Maintenance activities, which would likely be substantially greater than in previous, fully remediated scenarios.

This estimate is solely conceptual in nature and is not based primarily upon actual costs (unlike the Dredging/Processing/Disposal unit rate analyses performed previously).

As in the previous Dredging/Processing/Disposal cost estimates, based on previous Government direction and to maintain consistency, full scale dredging and processing pricing was assumed for the wetlands remediation portion (years 28-30) of the estimate.

Among the components of this submittal are the "general basis and remedial approach" which provided the starting point for the cost estimate. It should be noted that these initial assumptions were revised as needed during further refinement and review of the cost estimate.

Lastly, it should be noted that the net present value, as in the previous estimates, was calculated with the assumption that the entire program would continue to be funded incrementally. As such, the net present value was calculated by converting the funding required in any given year to 2007 dollars based on 3.5% annual inflation.

If you have any questions please do not hesitate to call me.

DCN# ACE-J23 35BG0108-G2-0013

Attachments: Summary Unit Price Table

Detailed Draft Conceptual Estimate – Alternative #2

EPA's Assumed Approach for Alternative #2

General Basis and Remedial Approach

Additional Assumptions and Questions

Preliminary Conceptual Timeline of Activities (changed as estimate evolved)

NEW BEDFORD HARBOR
UNIT RATE ANALYSIS

FUNDING SCENARIO	$15 MIL/YR				
	2.1%	2.5%	3%	3.5%	3.5%
					ALTERNATIVE 2
TOTAL COST	$ 809,169,685	$ 888,646,062	$ 998,847,389	$ 1,127,869,315	$ 587,297,707
TOTAL NET PRESENT VALUE	$ 530,572,822	$ 534,391,608	$ 537,733,083	$ 541,423,832	$ 340,234,921
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	30	30	30	30	N/A
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	40	40	40	40	30

FUNDING SCENARIO	$20 MIL/YR			
	2.1%	2.5%	3.0%	3.5%
TOTAL COST	$ 678,147,032	$ 779,682,346	$ 897,325,520	$ 983,490,472
TOTAL NET PRESENT VALUE	$ 483,856,484	$ 492,793,787	$ 514,529,610	$ 508,768,046
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	22	24	25	26
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	32	33	34	35

FUNDING SCENARIO	$22.5 MIL/YR				
	2.1%	2.5%	3.0%	3.5%	8.0%
TOTAL COST	$ 585,626,109	$ 647,155,184	$ 739,542,634	$ 866,474,832	$ 3,226,580,911
TOTAL NET PRESENT VALUE	$ 447,637,117	$ 458,244,843	$ 470,808,721	$ 487,550,859	$ 1,283,380,231
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	18	21	21	22	27
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	26	28	30	32	37

FUNDING SCENARIO	$25 MIL/YR			
	2.1%	2.5%	3.0%	3.5%
TOTAL COST	$ 500,000,000	$ 550,000,000	$ 637,083,518	$ 720,101,786
TOTAL NET PRESENT VALUE	$ 404,868,236	$ 419,135,331	$ 441,335,273	$ 451,706,751
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	15	16	17	19
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	20	22	25	27

FUNDING SCENARIO	$30 MIL/YR			
	2.1%	2.5%	3.0%	3.5%
TOTAL COST	$ 450,000,000	$ 480,000,000	$ 510,000,000	$ 540,000,000
TOTAL NET PRESENT VALUE	$ 382,609,617	$ 391,650,080	$ 394,983,555	$ 395,690,452
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	11	11	12	13
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	15	16	17	18

FUNDING SCENARIO	$55 MIL/YR			
	2.1%	2.5%	3.0%	3.5%
TOTAL COST	$ 340,067,179	$ 346,199,305	$ 355,210,164	$ 363,474,828
TOTAL NET PRESENT VALUE	$ 315,745,871	$ 316,574,807	$ 318,443,700	$ 319,381,328
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	5	5	5	6
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	7	7	7	7

FUNDING SCENARIO	$80 MIL/YR			
	2.1%	2.5%	3.0%	3.5%
TOTAL COST	$ 326,271,190	$ 330,058,418	$ 335,809,062	$ 340,620,240
TOTAL NET PRESENT VALUE	$ 309,532,762	$ 309,848,113	$ 311,004,908	$ 311,208,025
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE UPPER HARBOR REMEDIATION	4	4	4	4
TOTAL NUMBER OF YEARS REQUIRED TO COMPLETE REMEDIATION	5	5	5	5

NOTE: NET PRESENT VALUE ASSUMES THAT INTEREST RATE EQUALS RATE OF INFLATION.
NOTE: THE ESTIMATED COST VALUES PRESENTED IN THE TABLE ARE FOR COMPARATIVE PURPOSES ONLY AND SHOULD NOT BE USED FOR INDIVIDUALIZED DETAILED COST ESTIMATES.

NEW BEDFORD HARBOR
ALTERNATIVE 2 - CAD CELL ESTIMATE

Funding Scenario - $15 MIL/YR

	3.50%
	490

YEAR #		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ACTIVITY		Dredging	Dredging	Dredging	Install Sheets	Compl Sheets Dredge TSCA	Dredge TSCA	Dredge TSCA Dredge Non-TSCA	Dredge Non-TSCA	Dredge Non-TSCA	Dredge Non-TSCA	Dredge Non-TSCA	Dredge Non-TSCA	Demob Area C&D	Purchase of Marine Equip Prep Area C	Excavate Gravel	Excavate Gravel	Compl Excav Gravel Start Mechanical Dredge	Mechanical Dredge	Mechanical Dredge
YEAR	2004-2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
FUNDING		$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 16,217,635	$ 16,430,671	$ 15,718,570	$ 16,268,720	$ 16,838,126	$ 17,427,460	$ 12,732,218	$ 17,699,542	$ 18,161,271	$ 16,566,666	$ 16,880,250	$ 15,000,000	$ 15,000,000	$ 15,000,000
FIXED COSTS																				
PLANNING & REPORTING		$ 202,203	$ 209,280	$ 216,605	$ 224,186	$ 232,032	$ 240,153	$ 248,559	$ 257,258	$ 266,262	$ 275,582	$ 285,227	$ 295,210	$ 305,542	$ 316,236	$ 327,305	$ 338,760	$ 350,617	$ 362,888	$ 375,589
PROJECT MANAGEMENT		$ 1,555,268	$ 1,609,723	$ 1,666,064	$ 1,724,376	$ 1,784,729	$ 1,847,195	$ 1,911,846	$ 1,978,761	$ 2,048,018	$ 2,119,698	$ 2,193,888	$ 2,270,674	$ 2,350,147	$ 2,432,403	$ 2,517,537	$ 2,605,650	$ 2,696,848	$ 2,791,238	$ 2,888,931
MOBILIZATION/DEMOBILIZATION		$ 2,256,810	$ 2,335,799	$ 2,417,552	$ 1,251,083	$ 3,753,249	$ 2,680,383	$ 2,774,196	$ 2,871,293	$ 2,971,788	$ 3,075,801	$ 3,183,454	$ 3,294,875	$ 10,000,000	$ 1,000,000	$ 1,035,000	$ 1,071,225	$ 1,108,718	$ 1,147,523	$ 1,187,686
SAMPLING & ANALYSIS		$ 314,524	$ 325,532	$ 336,926	$ 75,000	$ 209,231	$ 373,556	$ 386,630	$ 440,179	$ 455,585	$ 471,530	$ 488,034	$ 505,115	$ 418,235	$ 432,874	$ 448,024	$ 463,705	$ 479,935	$ 596,079	$ 616,942
O & M		$ 602,475	$ 623,561	$ 645,386	$ 667,974	$ 691,353	$ 715,551	$ 740,595	$ 766,516	$ 793,344	$ 821,111	$ 849,850	$ 879,595	$ 910,380	$ 942,244	$ 975,222	$ 1,009,355	$ 1,044,682	$ 1,081,246	$ 1,119,090
FEE		$ 924,375	$ 908,039	$ 902,900	$ 948,146	$ 894,398	$ 922,290	$ 931,273	$ 903,198	$ 934,810	$ 967,528	$ 1,001,392	$ 819,056	$ 1,140,986	$ 1,172,764	$ 1,023,136	$ 1,054,596	$ 847,199	$ 838,788	$ 830,083
NAE EXPENDITURES		$ 1,166,236	$ 1,207,054	$ 1,249,301	$ 1,293,027	$ 1,338,283	$ 1,385,122	$ 1,433,602	$ 1,483,778	$ 1,535,710	$ 1,589,460	$ 1,645,091	$ 1,702,669	$ 1,762,263	$ 1,823,942	$ 1,887,780	$ 1,953,852	$ 2,022,237	$ 2,093,015	$ 2,166,271
ENSR SEDIMENT SAMPLING & WQM		$ 563,953	$ 583,691	$ 604,120	$ 416,843	$ 625,265	$ 647,149	$ 669,799	$ 453,004	$ 468,859	$ 485,269	$ 502,254	$ 519,833	$ 538,027	$ 556,858	$ 576,348	$ 596,520	$ 977,886	$ 1,012,112	$ 1,047,536
BATTELLE DATABASE O&M & WEB		$ 287,163	$ 297,214	$ 307,616	$ 212,255	$ 318,383	$ 329,526	$ 341,059	$ 230,668	$ 238,742	$ 247,097	$ 255,746	$ 264,697	$ 273,961	$ 283,550	$ 293,474	$ 303,746	$ 314,377	$ 325,380	$ 336,769
SUBTOTAL		**$ 7,873,027**	**$ 8,099,894**	**$ 8,346,469**	**$ 6,812,890**	**$ 9,846,923**	**$ 9,140,925**	**$ 9,437,560**	**$ 9,384,655**	**$ 9,713,118**	**$ 10,053,077**	**$ 10,404,935**	**$ 10,551,724**	**$ 17,699,542**	**$ 8,960,870**	**$ 9,083,825**	**$ 9,397,409**	**$ 9,842,499**	**$ 10,248,270**	**$ 10,568,897**
REMAINING FUNDING		$ 7,126,973	$ 6,900,106	$ 6,653,531	$ 8,187,110	$ 5,153,077	$ 7,076,710	$ 5,310,186	$ 6,333,915	$ 6,555,602	$ 6,785,048	$ 7,022,525	$ 2,180,494	$ -	$ -	$ -	$ 7,482,840	$ 1,416,081	$ 4,751,730	$ 4,431,103
REMAINING FUNDING AFTER 1ST ACTIVITY FOR SEASON						$ 1,692,827		$ 1,682,924												
APPLICABLE UNIT RATE TSCA HYD DREDGING ($/CY)		304	315	326		349	361	374	387	400	414	429	444	459	475	492	509	527	546	565
APPLICABLE UNIT RATE SHEETPILING ($/DAY)					155,250	155,250														
APPLICABLE UNIT RATE NON-TSCA HYD DREDGING ($/CY)								312	323	334	346	358	371							
APPLICABLE UNIT RATE MECHANICAL DREDGING ($/CY)																	68	70	73	75
# OF DREDGING DAYS NON-TSCA								11	40	40	40	40	12							
# OF DREDGING DAYS TSCA		48	45	42		11	40	29										40	131	118
# OF SHEETPILING DAYS					53	21														
VOLUME DREDGED TSCA (CY)	0	23,444	21,930	20,431	0	5,426	19,600	14,210	0	0	0	0	0	0	0	0		20,179	65,423	58,945
CUMULATIVE VOLUME TSCA	0	23,444	45,374	65,806	65,806	71,231	90,831	105,041	105,041	105,041	105,041	105,041	105,041	105,041	105,041	105,041	105,041	125,221	190,644	249,589
VOLUME DREDGED NON-TSCA ORGANICS(CY)							0	5,390	19,600	19,600	19,600	19,600	5,880							
CUMULATIVE VOLUME NON-TSCA ORGANICS								5,390	24,990	44,590	64,190	83,790	89,670							
CAD CELL ALTERNATIVE FIXED COSTS																				
PURCHASE MARINE EQUIPMENT															$ 6,296,722					
PREP AREA C															$ 2,903,679					
EXCAVATE GRAVEL																$ 7,482,840	$ 7,482,840	3,741,420		

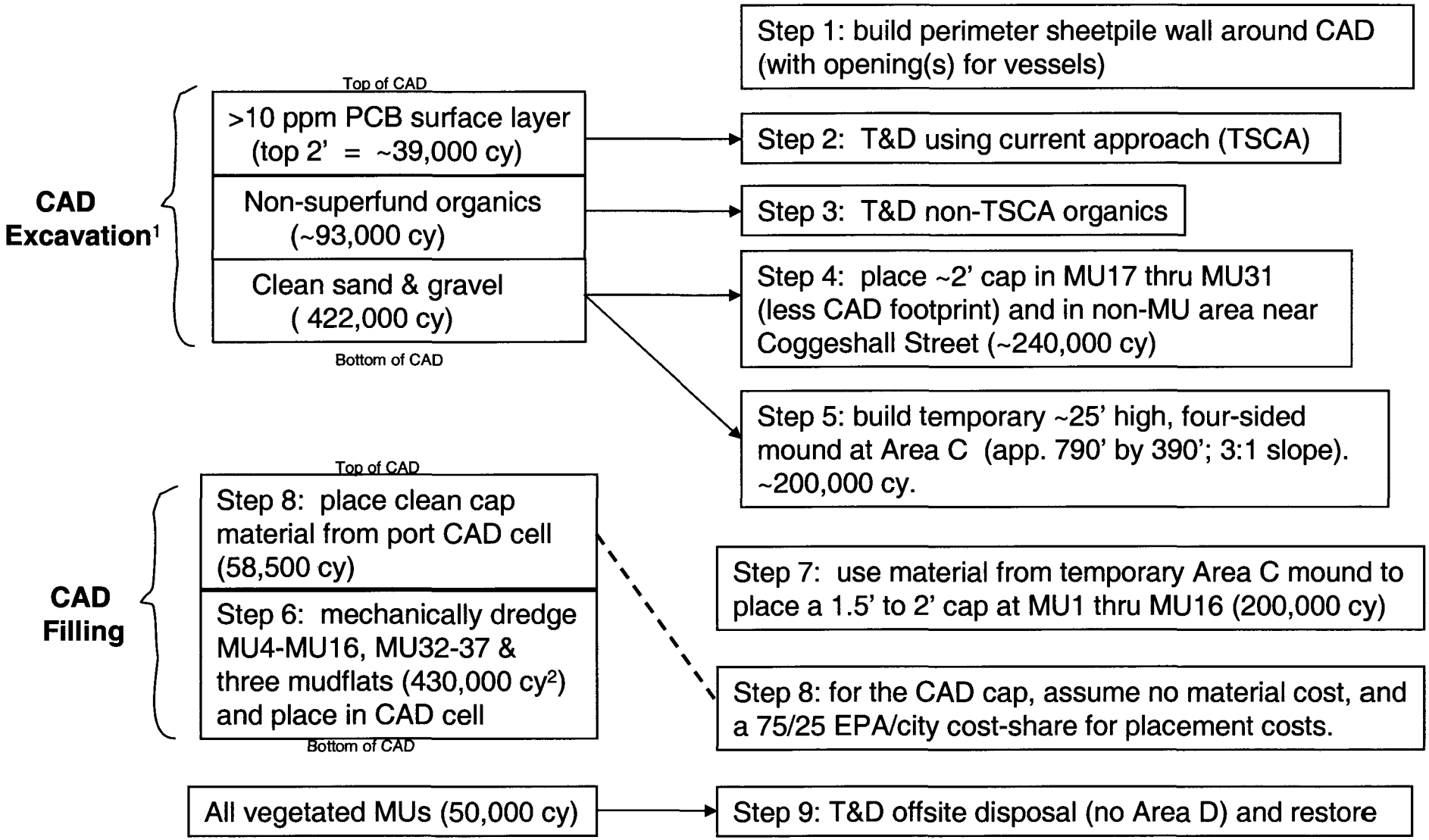
add 3-4 yr for Dredging shift cap work out by one year (volume =519,000)

	3.50%
	490

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	Mechanical Dredge	Mechanical Dredge	Mechanical Dredge	Mechanical Dredge	Mechanical Dredge	Cap MU-1	Cap MU-1	Remove Sheets Add Cap CAD Cell	Wetlands Remediation	Wetlands Remediation	Wetlands Remediation	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 26,789,733	$ 19,237,836	$ 34,640,940	$ 35,853,373	$ 37,108,241	$ 3,642,062	$ 3,769,534	$ 3,901,467	$ 4,038,019	$ 4,179,350	$ 4,325,627	$ 4,477,024	$ 4,633,720	$ 4,795,900	$ 4,963,756
FIXED COSTS																					
PLANNING & REPORTING	$ 388,735	$ 402,341	$ 416,423	$ 430,998	$ 446,082	$ 461,695	$ 477,855	$ 494,580	$ 511,890	$ 529,806	$ 548,349	$ 283,771	$ 293,703	$ 303,982	$ 314,622	$ 325,633	$ 337,031	$ 348,827	$ 361,036	$ 373,672	$ 386,750
PROJECT MANAGEMENT	$ 2,990,044	$ 3,094,695	$ 3,203,010	$ 3,315,115	$ 3,431,144	$ 3,551,234	$ 3,675,527	$ 3,804,171	$ 3,937,317	$ 4,075,123	$ 4,217,752	$ 436,537	$ 451,816	$ 467,630	$ 483,997	$ 500,937	$ 518,469	$ 536,616	$ 555,397	$ 574,836	$ 594,956
MOBILIZATION/DEMOBILIZATION	$ 1,229,255	$ 1,272,279	$ 1,316,809	$ 1,362,897	$ 1,410,599	$ 1,459,970	$ 1,511,069	$ 1,563,956	$ 5,713,267	$ 5,913,231	$ 6,120,194	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SAMPLING & ANALYSIS	$ 446,974	$ 462,618	$ 478,810	$ 495,568	$ 512,913	$ 371,606	$ 384,612	$ 398,073	$ 796,239	$ 824,107	$ 852,951	$ 441,402	$ 456,851	$ 472,841	$ 489,390	$ 506,519	$ 524,247	$ 542,596	$ 561,587	$ 581,242	$ 601,586
O & M	$ 1,158,258	$ 1,198,797	$ 1,240,755	$ 1,284,181	$ 1,329,128	$ 1,375,647	$ 1,423,795	$ 1,473,628	$ 1,525,205	$ 1,578,587	$ 1,633,837	$ 507,307	$ 525,062	$ 543,439	$ 562,460	$ 582,146	$ 602,521	$ 623,609	$ 645,436	$ 668,026	$ 691,407
FEE	$ 831,461	$ 822,500	$ 813,225	$ 803,625	$ 793,690	$ 794,510	$ 1,581,755	$ 1,063,641	$ 1,965,873	$ 2,034,678	$ 2,105,892	$ 121,004	$ 125,239	$ 129,622	$ 134,159	$ 138,855	$ 143,714	$ 148,744	$ 153,951	$ 159,339	$ 164,916
NAE EXPENDITURES	$ 2,242,090	$ 2,320,563	$ 2,401,783	$ 2,485,845	$ 2,572,850	$ 2,662,900	$ 2,756,101	$ 2,852,565	$ 2,952,405	$ 3,055,739	$ 3,162,690	$ 654,677	$ 677,590	$ 701,306	$ 725,852	$ 751,257	$ 777,551	$ 804,765	$ 832,932	$ 862,084	$ 892,257
ENSR SEDIMENT SAMPLING & WQM	$ 975,780	$ 1,009,932	$ 1,045,280	$ 1,081,865	$ 1,119,730	$ 1,043,029	$ 1,079,535	$ 1,117,318	$ 1,427,685	$ 1,477,653	$ 1,529,371	$ 633,160	$ 655,320	$ 678,257	$ 701,996	$ 726,565	$ 751,995	$ 778,315	$ 805,556	$ 833,750	$ 862,932
BATTELLE DATABASE O&M & WEB	$ 313,700	$ 324,679	$ 336,043	$ 347,805	$ 359,978	$ 335,319	$ 347,056	$ 359,202	$ 726,972	$ 752,416	$ 778,751	$ 564,205	$ 583,952	$ 604,390	$ 625,544	$ 647,438	$ 670,098	$ 693,552	$ 717,826	$ 742,950	$ 768,953
SUBTOTAL	**$ 10,576,298**	**$ 10,908,406**	**$ 11,252,137**	**$ 11,607,900**	**$ 11,976,114**	**$ 12,055,909**	**$ 13,237,304**	**$ 13,127,134**	**$ 19,556,851**	**$ 20,241,340**	**$ 20,949,787**	**$ 3,642,062**	**$ 3,769,534**	**$ 3,901,467**	**$ 4,038,019**	**$ 4,179,350**	**$ 4,325,627**	**$ 4,477,024**	**$ 4,633,720**	**$ 4,795,900**	**$ 4,963,756**
REMAINING FUNDING	$ 4,423,702	$ 4,091,594	$ 3,747,863	$ 3,392,100	$ 3,023,886	$ 2,944,091	$ 13,552,429	$ 6,110,701	$ 15,084,089	$ 15,612,033	$ 16,158,454	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
APPLICABLE UNIT RATE TSCA HYD DREDGING ($/CY)	584	605	626	648	671	0	0	0	0	0	0	0	0	0							
APPLICABLE UNIT RATE SHEETPILING ($/DAY)																					
APPLICABLE UNIT RATE NON-TSCA HYD DREDGING ($/CY)																					
APPLICABLE UNIT RATE MECHANICAL DREDGING ($/CY)	78	81	83	86	89	0															
# OF DREDGING DAYS NON-TSCA																					
# OF DREDGING DAYS	114	102	90	79	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUME DREDGED TSCA (CY)	56,857	50,810	44,968	39,323	33,869	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CUMULATIVE VOLUME TSCA	306,446	357,256	402,223	441,546	475,415	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAD CELL ALTERNATIVE FIXED COSTS																					
PURCHASE MARINE EQUIPMENT																					
PREP AREA C																					
EXCAVATE GRAVEL																					
CAP MU-1						$ 2,944,091	$ 13,552,429														
REMOVE SHEETS ADD CAP CAD CELL								6,110,701													

TOTAL YEARS (not including O&M)	30
TOTAL COST (BASED ON YEARLY FUNDING)	**$ 587,297,707**
NET PRESENT VALUE	**340,234,921**

Alt. #2 (revised), NBH Alternatives Analysis - Nov. 2006
1 CAD cell, cap not dredge MU17 – MU31
Assumed approach for initial cost estimating



[1]The CAD cell volume is based on the "Alternative 1" size in the draft 9/05 CAD cell tech. memo.
[2]Table 2, Vol. and Area Report, FWEC, June 2003. MU102 assumed dredged in 2007.

GENERAL BASIS AND REMEDIAL APPROACH FOR DEVELOPING A ROUGH ORDER OF MAGNITUDE COST ESTIMATE AND SCHEDULE FOR EPA'S CAD CELL ALTERNATIVE

Step 1: Perimeter Sheetpile

Sheets:	60 feet pz 38	3500 lf x 60 foot sheets x 38 #/foot = 7,980,000 #
	3500 lf	7,980,000 #/ 2000 #/ton = 4,000 tons

Note: The Tech Memo shows ~3,100 linear feet of sheetpile along the perimeter of Cell 1. For this calculation 3,500 linear feet is assumed to account for limited additional linear footage and bracing (currently undefined).

Assumed production rate = 50 feet per day Duration 70 working days

SES has given Jacobs a quote to supply and install the sheets at a cost of $10,500,000.00. To complete this task a land-based operation would be required to unload and prepare the steel sheets. The operation would consist of the following resources:

crane
loader
6-man crew

The land-based crew would load the sheets onto flat decks and push boats would bring the sheets to the pile driving crew. The operation would consist of the following resources:

2 cranes
2 flat decks
4 push boats
20-man crew

The sheets would be installed to depth and may need to have an additional support system installed to allow the cell to be fully excavated.

Steps 2 and 3: Removal of TSCA and NON-TSCA Material

The removal of the top 2 feet of TSCA material would be completed using the current hydraulic dredging approach. The removal of the next 93,000 yards of non-TSCA material would also follow the existing approach with a reduced disposal rate. This rate is $92.00 per ton.

The crew and equipment size would remain the same as the present operation.

Steps 4 and 5: Stockpiling and Contaminated Sediment Capping

Steps 4 and 5 would start after the purchase of the long-term marine equipment necessary to implement the CAD-Cell approach described herein, and the preparation work required at Area C.

Major marine equipment purchases would be required for this alternative, since some of the equipment needed is relatively unique due the nature of the work in a shallow harbor. Barges and scows would have to have a maximum of 3 to 3.5 feet of draft when fully loaded. Dump scows would have a 100 CY maximum capacity and would have approximate dimensions of 25 feet x 56 feet. The flat deck barges that would carry the excavators and cranes would be 27 feet x 80 feet. The push boats would be made of steel and have a minimum of 150 hp. It is estimated that the following equipment would need to be purchased to meet the required production rates:

6 dump scows
2 flat decks
8 push boats

The preparation work at the upper portion of Area C would include the demobilization of all SES desanding and pumping equipment. Removal of all above ground structures including the interior fence, pumps and catwalks located at Cell 2 and Cell 3, existing WWTP and sand filter. A crane would be used to dismantle the 2 RUBB buildings and they would be shipped off site. The existing utilities would be disconnected and capped below ground. All temporary storage trailers and decontamination pads would be removed. At the completion of this work a new drainage system will be installed around the outside of the stockpile area to collect stormwater runoff from the pile. This system would include at a minimum manholes, ADS Piping and a discharge structure to the river.

The following equipment would be needed to complete this work at Area C:

Dozer
Roller
Crane
Excavator (2)
Loader (2)

It would take a 20-man crew approximately 90 working days to complete this preparation.

Steps 4 and 5 include stockpiling glaciofluvial sediments at Area C and spreading gravel (glaciofluvial sediments) as cap material in MU17-31. Approximately 422,000 yards of

gravel will be excavated from the CAD Cell and transported for one of these two operations. The production rate for this work will be 100 CY per hour, and it would take approximately 422 working days to complete assuming 10 hours of production per day. The excavation of this material will be completed using a 100-ton crane with a 6-yard clamshell bucket. The excavated material will be placed into the scows and the scows will be pushed to Area C or the cap area of MU17-MU31. The material that is placed as a cap will be placed with a crane and a clamshell bucket. The material that will be stockpiled at Area C will be removed from the scows with an excavator and conveyed from the dock area to the top of the site. The material will be loaded into trucks and moved to the west end of the site to the dozer making the stockpile.

Equipment needed to complete this task includes the following, in addition to the equipment, previously listed, that would need to be purchased:

Dozer
30-ton end dumps (2)
100-ton crane (2)
Excavator
Stacking conveyor
Loader

A 25-man crew would also be required for this work.

The mobilization and demobilization costs will be high due to the cranes on the water. The equipment will be mobilized and demobilized 3 separate times over the course of three years. Additional elevation control will have to be added to the cranes for excavation and capping.

Step 6:Mechanical dredging

The removal rate assumed to mechanically dredge the contaminated sediments to be disposed of in the CAD Cell is estimated at 500 CY per day. Therefore it is estimated that approximately 860 working days would be required to complete this work.

The removal of contaminated sediments will be completed with a hydraulic excavator with an environmental bucket. The excavator will have GPS installed on the unit for improved excavation depth control. The excavated material will be placed into the scows and transported to the CAD cell area. The CAD cell will have a silt curtain door and an oil boom will be placed around the perimeter of the sheetpile. The door will be closed once the scow has been placed inside the cell. The material will be dumped and once the water has cleared the door will be opened and the scow pushed back to the excavation area. Due to the tides and the time it will take to move this equipment, 2 excavators will be used during this phase. The first will be working closer to the shore while the second excavator is located in the deeper water.

Equipment needed to complete this work

Marine equipment
2 excavators with environmental buckets

A 15-man crew would be required for this work.

Step 7:Cap MU1- MU16

The production rate for the capping operation will be the same as the excavation, approximately 500 CY per day. At this production rate it will take 400 working days to complete.

The material used to cap MU1-MU16 will be from the clean material stockpiled at Area C. This material will be placed into the scows at the dock area. The loaded scows will be pushed to the excavator on the flat deck barge. The excavator with a clamshell bucket will remove the material from the scow and place it over the excavated area. This excavator would be the same machine that was used to excavate the material from the CAD Cell.

Equipment needed to complete this work

Marine equipment
Excavator with clamshell bucket (2)
Dozer
Loader
30-ton end dumps (2)
Excavator

A minimum of a 22-man crew will be needed to complete this work. At the completion of the capping Area C will be graded to drain.

Step 8:Cap the CAD Cell

This step will also include the removal of the perimeter sheetpiles. The production rate for capping the CAD cell is assumed to be 1,000 CY per day. This rate is increased over the capping of MU1–MU16 due to the reduced distance to the material stockpile and the increased depth of the water. At the rate of 1,000 CY per day it will take approximately 60 working days to complete this work. The perimeter sheetpile will remain in place during the capping of the cell. This measure would help control the turbity during the capping operations. The rate of the removal of the sheets will be 75 linear feet per day, and at this rate it will take 42 days to remove all the perimeter sheets. As with the installation of the sheets, both a water based crew and a land-based crew would be needed. The same crews will be used to cap the cell. Due to the timing of the capping it

is assumed that 60,000 CY of 3-inch bank run gravel will be imported to the Area C location to be used as capping material. The borrow material will be trucked onto the site and stockpiled. The stockpiled material will be loaded into the scows and transported to the capping area. A crane will be used to place the material. Once the cap is completed the same crane will remove the sheets. A second crane will be onsite to unload the sheets from the barge and load trucks.

Equipment needed to complete this work is as follows:

100-ton crane (2)
Excavator
Loader
Conveyor
Dozer
Marine equipment

A 21-man crew will be required.

Additional Assumptions/Questions
For the Construction of the CAD Cell

Step 1

- Engineering of sheets and support system to allow the excavation of the cell would be required for an accurate cost estimate for this element of the work.

Step 2

- It is assumed the dredge will be able to pull on the CAD cell sheets. The design can ensure this capability.

Step 3

Sampling of filter cake:

- More samples of the filter cake will have to be taken in order to send the material to non-TSCA landfill.
- Material will have to be stockpiled while waiting to be loaded. This may cause a storage problem at Area D that could reduce production. This estimate assumes no reduction in production.

Step 4

Covering contaminated material:

- Will modifying the elevation of the river bottom cause adverse hydraulic effects such as flooding surrounding areas? Modeling needed to assess the possibility. This approach could increase the size of mudflats and their locations.
- How do you ensure that the contaminated material gets covered if you place the cap material on the soft sediment? The material could be displaced or intermingled rather than covered. Pilot test needed to assess the viability of covering the contaminated sediments.
- Additional cap material may be needed depending on the success of capping.

Step 5

- Can the Sawyer St. cells withstand the surcharge that would be caused by stockpiling over them?
- Do we clean the Sawyer St. cells or remove water and cover over existing soils? Estimate assumes soils left in place.
- Do we have to do something with the DDA? Estimate assumes materials are left in place.
- Trailer complex will remain in place
    - Stockpile will be started on the west end of the site and move to the east
- Utilities and foundations/slags will remain in place
- How do we grade the site at completion?
- Will the stockpile have to be covered? Estimate assumes no covering or dust control.

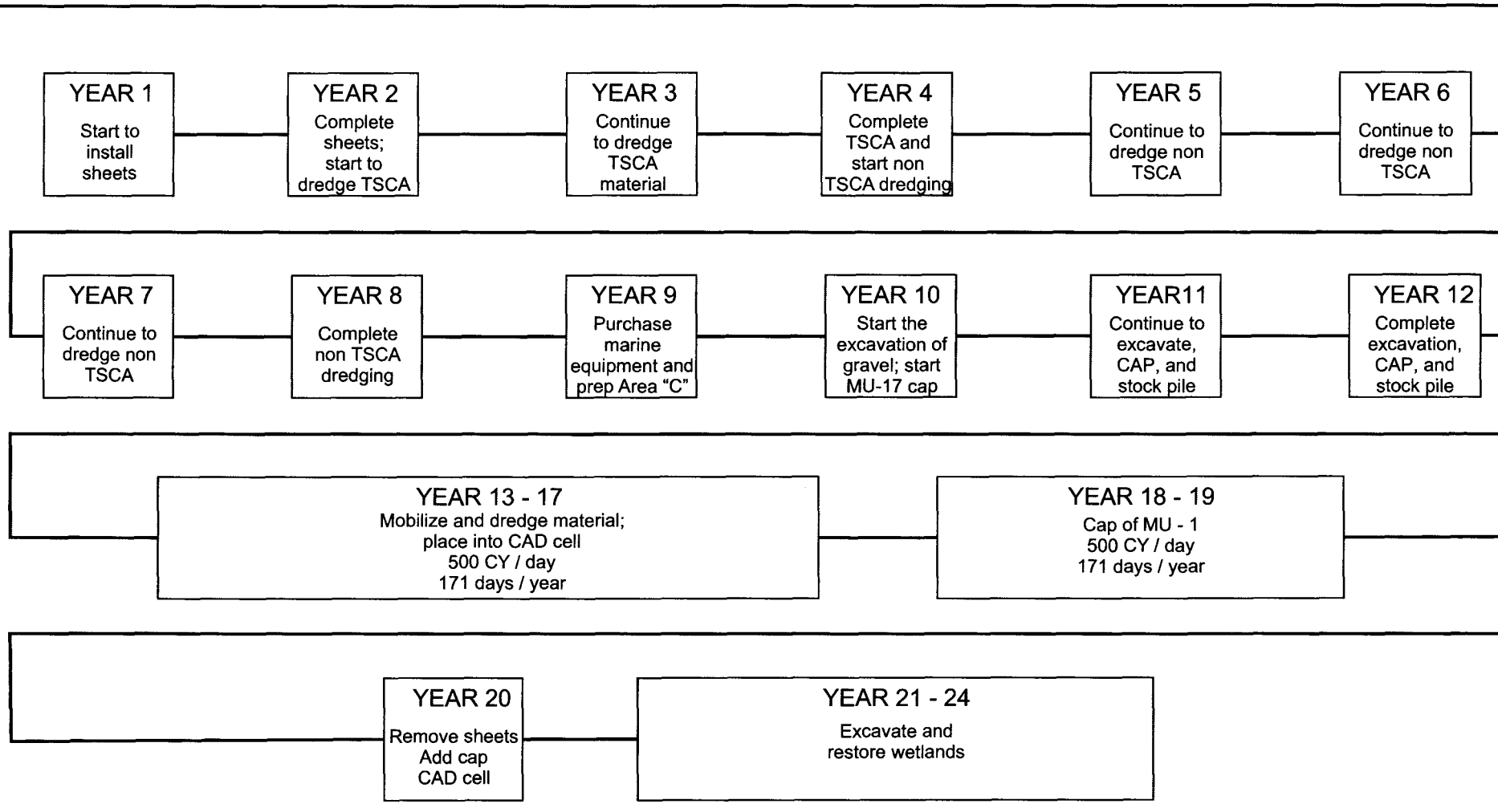
Step 6

- Can the material be hydraulically dredged and if so what are the treatment requirements if any? This analysis assumes mechanical dredging would be required by the Government.

- Will the water quality monitoring remain the same? It is assumed that the pushboats involved would create serious water quality issues, much worse that the current operation.

Step 7

- Will any long term monitoring devices have to be installed at the completion of the CAD cell? None are assumed in this exercise.



- Cost to buy and install sheets $10,500,000
- Cost for non TSCA material disposal is $92 / ton
- 20,000 cubic yards (CY) per year was used for TSCA
- 22,500 CY per year was used for non TSCA
- 1,000 CY per day was used for excavation
- 500 CY per day was used for mechanical dredge
- Average crew size would be 24 people during the project

JACOBS

Calculations

New Bedford Superfund Site

CROBERTS 01/03/07

Figure 1